NIRPC Complete Streets Design Guide

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Northwestern Indiana Regional Planning Commission (NIRPC)

Complete the Streets

COMPLETE STREETS
COMPLETE NETWORKS

atpolicy.org

A Manual for the Design of Active Transportation

ACTIVE TRANSPORTATION ALLIANCE

Complete the Streets

Active Trans CS Manual

- Developed in 2012
- Exhaustive Analysis of CS Design
- Major Goals:
  - Establish Design Practices
  - Address Challenges
  - Coordinate Planning Initiatives
- Design based on nationally-accepted standards of AASHTO, MUTCD, and locally-based best practices (Chi, NYC, SF, etc.)

Complete the Streets

+ INTRODUCTION

1 CHAPTER 1: BASIS
COMPLETE DESIGN PROCESSES AND POLICIES

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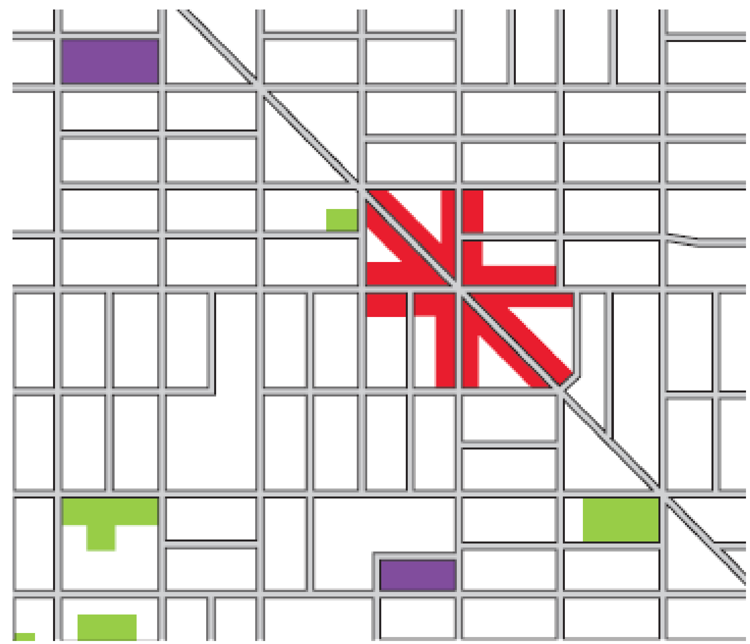
CONVENTIONAL SUBURBAN NETWORK

TRADITIONAL URBAN GRID NETWORK



2 CHAPTER 2: TYPOLOGIES
COMPLETE NETWORKS THROUGH PLACES, MODES, AND LINKS

TABLE 2A CONTEXT ZONE CHARACTERISTICS	Development Pattern		
	Urban	Suburban	Rural
Housing Density	High	Medium	Low
Building Setbacks	Low	Medium	High
Roadway Grid Density	High	Medium	Low
Transit Service Provision	High	Medium	Low

Places: Context Zone Connections

Places provide the reference to select a c
zone and help to determine appropriate a
A context zone is identified by three level
consideration: Development pattern, land
and special district considerations. To sele
context zone, look to an area's existing pl
documents and land-use characteristics.

FIGURE 2.1D
SUBURBAN AREAS
Oak Park, IL

FIGURE 2.1E
RURAL AREA
Elgin, IL

Links: Roadway Connections

Corridors link people to places. Assessing existing corridor conditions and the role of the corridor within the network provides the reference to select street typology, classified as boulevards, avenues, streets, and alleys. The street typology will help to determine appropriate modal facilities and allocation of the right-of-way. To select a street typology, review the existing conditions of the roadway, often characterized by the roadway's functional classification, along with modal accommodations and context zones.

TABLE 2B FUNCTIONAL CLASS	Street Typology		
	Boulevard	Avenue	Street
Principal Arterial	■	■	■
Minor Arterial	■	■	■
Collector		■	■
Local			■

TABLE 2B
This table shows the relationship between Functional Class and Street Typology

FUNCTIONAL CLASSIFICATION 2.9

The Federal Highway Function and Classification system is commonly used to define streets' function and operational requirements and provide the primary basis for geometric design criteria. Traffic volume, trip characteristics, speed, level of service, and other measures are used in the functional classification system, which groups roadways as principal/primary arterial, secondary arterial, collector, or local streets. Because functional classification measures focus primarily on motor vehicle uses and do not reference a roadway's context zone, this tool is most appropriate to high-speed rural and suburban roadways. Although functional classification is a useful tool for Complete Streets roadway design, it provides little guidance to determine design function for bicyclists or pedestrians, especially in urban settings. A street typology system can work in concert with the functional classification system, but the classifications will not translate directly.

PRINCIPAL/PRIMARY ARTERIAL The largest designation, typically multi-lane roadways with high traffic volumes (over 20,000 ADT) and high speeds (35 mph to 50 mph), ideally spaced at 2- to 4-mile intervals.

SECONDARY ARTERIAL Typically multi-lane roadways with moderately high traffic volumes (over 10,000 ADT) and moderately high speeds (30 mph to 45 mph), ideally spaced at 1- to 2-mile intervals.

COLLECTOR Typically two-lane or multi-lane, two-way streets with moderate traffic volumes (over 5,000 ADT) and moderate speeds (25 mph to 35 mph), ideally spaced at quarter-mile to 1-mile intervals.

LOCAL STREETS Typically two-lane, two-way roads with low traffic volumes (under 5,000 ADT) and moderate speeds (20 mph to 25 mph), ideally spaced at 200- to 600-foot intervals. Local streets often are not marked with center dividing lines.

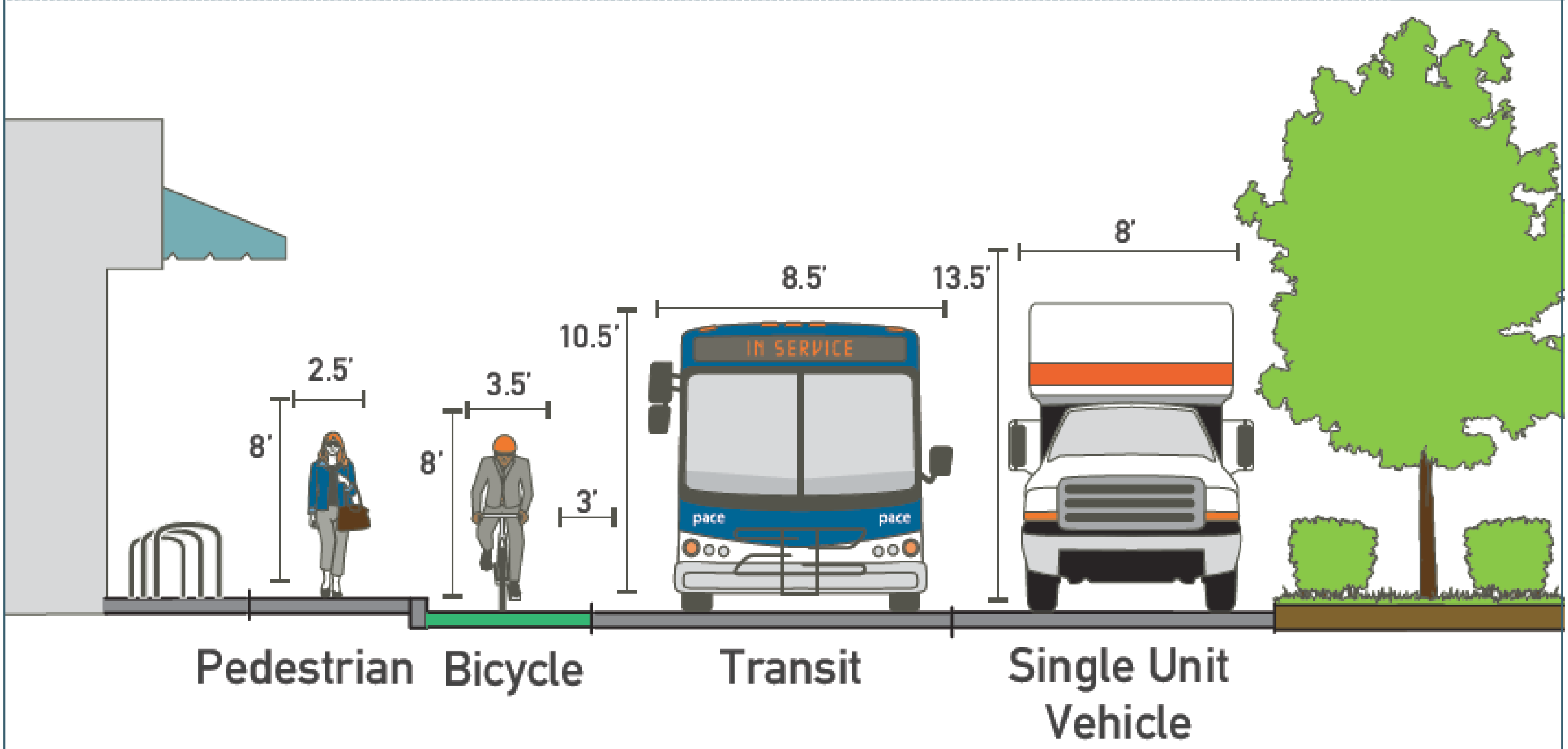

2.5'
8'
3.5'
8'
3'
10.5'
IN SERVICE
pace
pace
8.5'
13.5'
8'
Pedestrian
Bicycle
Transit
Single Unit Vehicle

TABLE 2E CONTEXT ZONE MODE PRIORITIZATION

	Boulevard				Avenue & One Way Avenue				Street, One Way Street			
	1	2	3	4	1	2	3	4	1	2	3	4
Urban Commercial/Mixed Use	Transit	Auto	Walk	Bike	Walk	Bike	Transit	Auto	Walk	Bike	Auto	Transit
Urban Residential	Auto	Transit	Walk	Bike	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Transit
Urban Single Use	Auto	Transit	Bike	Walk	Bike	Walk	Auto	Transit	Bike	Walk	Auto	Transit
Suburban Commercial	Auto	Transit	Walk	Bike	Transit	Auto	Walk	Bike	Walk	Auto	Bike	Transit
Suburban Residential	Auto	Walk	Transit	Bike	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Transit
Suburban Mixed-Use	Transit	Walk	Auto	Bike	Walk	Bike	Transit	Auto	Walk	Bike	Auto	Transit
Suburban Single Use	Auto	Transit	Bike	Walk	Bike	Auto	Walk	Transit	Bike	Auto	Walk	Transit
Rural Residential/Agricultural	Auto	Transit	Bike	Walk	Auto	Bike	Walk	Transit	Walk	Auto	Bike	Transit
Rural Village	Auto	Walk	Transit	Bike	Walk	Auto	Bike	Transit	Walk	Bike	Auto	Transit

TABLE 2F PLACE OVERLAY MODE PRIORITIZATION

	Boulevard				Avenue & One Way Avenue				Street, One Way Street			
	1	2	3	4	1	2	3	4	1	2	3	4
Pedestrian Priority Areas	Transit	Walk	Auto	Bike	Walk	Transit	Bike	Auto	Walk	Bike	Auto	Transit
Entertainment/Cultural Districts	Transit	Auto	Walk	Bike	Walk	Transit	Bike	Auto	Walk	Bike	Auto	Transit
Transit Oriented Development	Transit	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Walk	Transit	Bike	Auto
Green Streets	Transit	Bike	Walk	Auto	Transit	Bike	Walk	Auto	Transit	Bike	Walk	Auto
Park Zones	Walk	Bike	Transit	Auto	Walk	Bike	Transit	Auto	Walk	Bike	Transit	Auto
School Zones	Walk	Bike	Transit	Auto	Walk	Bike	Transit	Auto	Walk	Bike	Transit	Auto
Home Zones	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Transit
Social Zones	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Transit

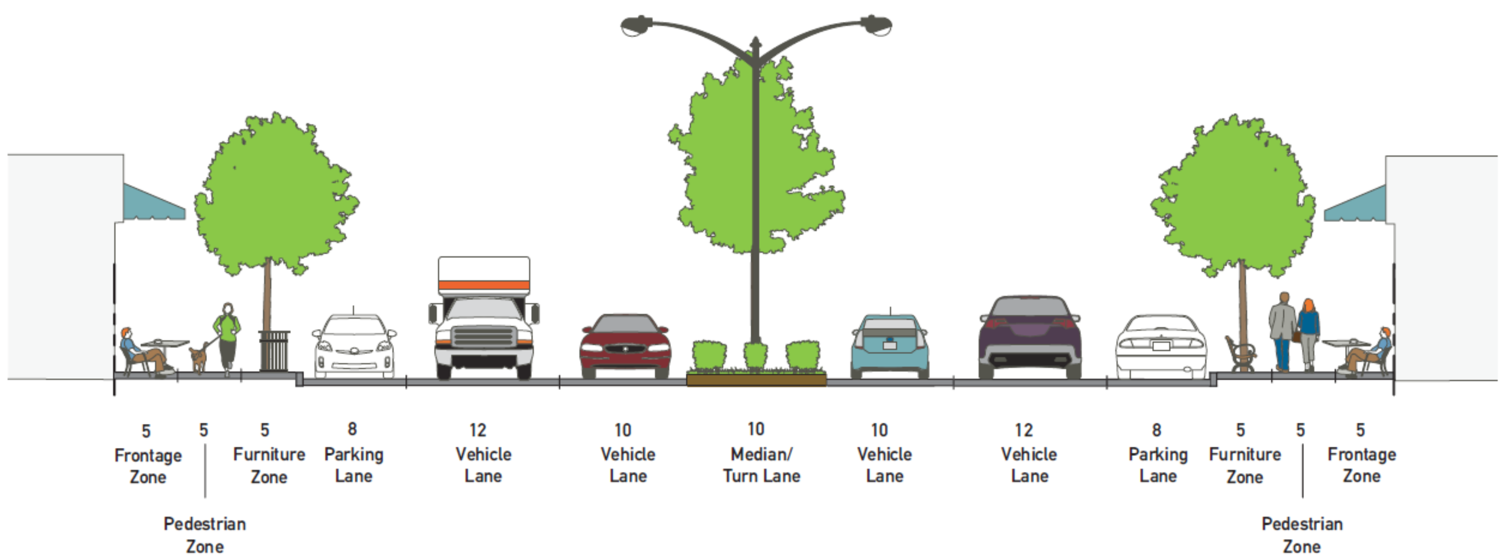
TABLE 2G BOULEVARD VARIATIONS

Context Zones		Mode Prioritization: Priority				Pedestrian Realm: Frontage	Pedestrian Zone	Furniture Zone	Curb Zone	Travel Way: Parking Lanes (Width)	Parking Lanes	Bikeway (Width)	Bikeway	Vehicle Lane (Width)	Vehicle Lanes	Median / Turn Lane	Median	Target Speed (MPH)	ROW (Total)
Urban	2.22D Unconstrained	Walk	Transit	Auto	Bike	2 ft.	6 ft.	10 ft.	2 ft.	8 ft.	2	12 ft.	Shared use paths	10 to 11 ft.	4 to 6	Varies	1 to 3	25	Varies
	2.22E Urban Commercial/Mixed Use	Transit	Auto	Walk	Bike	5 ft.	5 ft.	Parking	Parking	7 ft.	2	5 ft.	Bike lanes	10/11 ft.	4	12 ft.	1	35	100 ft.
	2.22F Urban Residential	Auto	Transit	Walk	Bike	1 ft.	6 ft.	7 ft.	1 ft.	7 ft.	2	0 ft.	Marked shared lanes	10/13 ft.	4	10 ft.	1	25	100 ft.
	2.22G Urban Single Use	Auto	Transit	Bike	Walk	2 ft.	6 ft.	Parking	Parking	8 ft.	2	7 ft.	Buffered bike lanes	11 ft.	4	10 ft.	1	35	100 ft.
Suburban	2.22H Suburban Commercial	Auto	Transit	Walk	Bike	0 ft.	Shared use paths	7 ft.	2 ft.	0 ft.	0	10 ft.	Shared use paths	12 ft.	4	14 ft.	1	35	100 ft.
	2.22I Suburban Residential	Auto	Walk	Transit	Bike	0 ft.	6 ft.	7 ft.	2 ft.	8 ft.	2	0 ft.	Shared lanes	12 ft.	4	8/14/8 ft.	3	20	120 ft.
	2.22J Suburban Mixed-Use	Transit	Walk	Auto	Bike	6 ft.	5 ft.	5 ft.	1 ft.	7 ft.	2	0 ft.	Marked shared lanes	11 ft.	4	10 ft.	1	15	100 ft.
	2.22K Suburban Single Use	Auto	Transit	Bike	Walk	0 ft.	5 ft.	4/7 ft.	1 ft.	0 ft.	0	8/10 ft.	Buffered bike lanes/ Shared use paths	12 ft.	4	16 ft.	1	35	100 ft.
Rural	2.22L Rural Residential/Agricultural	Auto	Transit	Bike	Walk	0 ft.	0 ft.	18 ft.	0 ft.	0 ft.	0	4 ft.	Paved shoulder	11/12 ft.	4	10 ft.	1	35	100 ft.
	2.22M Rural Village	Auto	Walk	Transit	Bike	5 ft.	5 ft.	4 ft.	1 ft.	8 ft.	2	0 ft.	Shared lanes	10/12 ft.	4	10 ft.	1	15	100 ft.
Context Overlays		Priority				Frontage	Pedestrian Zone	Furniture Zone	Curb Zone	Parking Lanes (Width)	Parking Lanes	Bikeway (Width)	Bikeway	Vehicle Lane (Width)	Vehicle Lanes	Median / Turn Lane	Median	Target Speed (MPH)	ROW (Total)
All	2.22N Pedestrian Priority Areas	Transit	Walk	Auto	Bike	5 ft.	5 ft.	Parking	Parking	7 ft.	2	0 ft.	Shared lanes	10/11 ft.	4	12 ft.	2	25	100 ft.
	2.22O Entertainment/Cultural Districts	Transit	Auto	Walk	Bike	8 ft.	5 ft.	5 ft.	1 ft.	7 ft.	2	0 ft.	Marked shared lanes	10/11 ft.	4	6 ft.	1	25	100 ft.
	2.22P Transit Oriented Development	Transit	Walk	Bike	Auto	2 ft.	5 ft.	5 ft.	1 ft.	0 ft.	0	8 ft.	Cycle track one direction	10/14 ft.	2/2BRT	10 ft.	1	25	100 ft.
	2.22Q Green Street	Transit	Bike	Walk	Auto	2 ft.	5 ft.	6 ft.	1 ft.	0 ft.	0	10 ft.	Urban greenway	10/11 ft.	4	10 ft.	1	15	100 ft.
	2.22R Park Zones	Walk	Bike	Transit	Auto	1 ft.	6 ft.	10/5 ft.	2 ft.	7 ft.	1	10 ft.	Cycle track two direction	10 ft.	4	10 ft.	1	15	100 ft.
	2.22S School Zones	Walk	Bike	Transit	Auto	0 ft.	Shared use paths	5 ft.	2 ft.	7 ft.	1	10 ft.	Shared use paths	10/11 ft.	4	10 ft.	1	15	100 ft.
	2.22T Home Zones	Walk	Bike	Auto	Transit	1 ft.	5 ft.	0 ft.	2 ft.	18 ft.	2	0 ft.	Shared lanes	10 ft.	4	4 ft.	2	10	100 ft.
	2.22U Social Streets	Walk	Bike	Auto	Transit	5 ft.	Frontage/ Vehicle Lane	4 ft.	1 ft.	18 ft.	2	0 ft.	Shared lanes	10 ft.	4	4 ft.	1	10	100 ft.

2.22M

BOULEVARD: RURAL VILLAGE

AUTO > TRANSIT > BIKE > WALK



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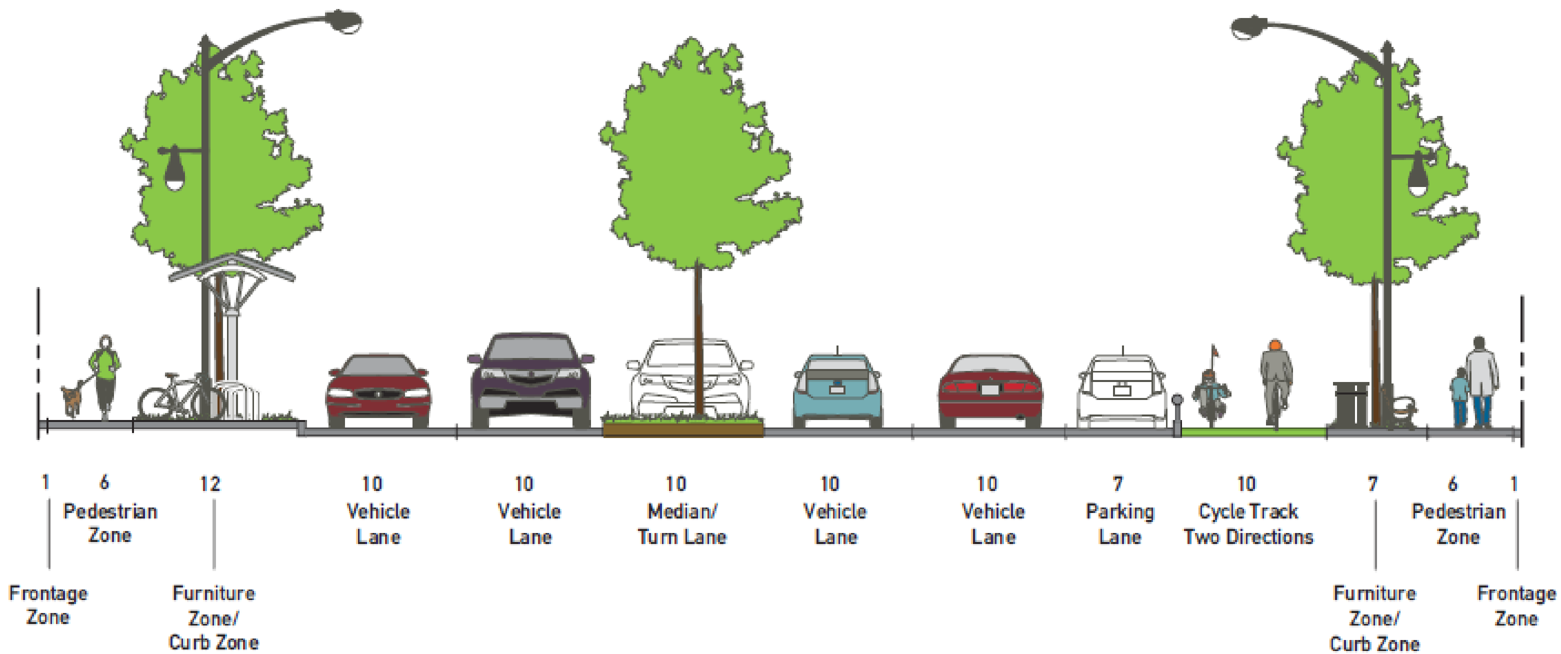
BOULEVARD: PARK ZONES

WALK > BIKE > TRANSIT > AUTO



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BOULEVARD: SCHOOL ZONES

WALK > BIKE > TRANSIT > AUTO

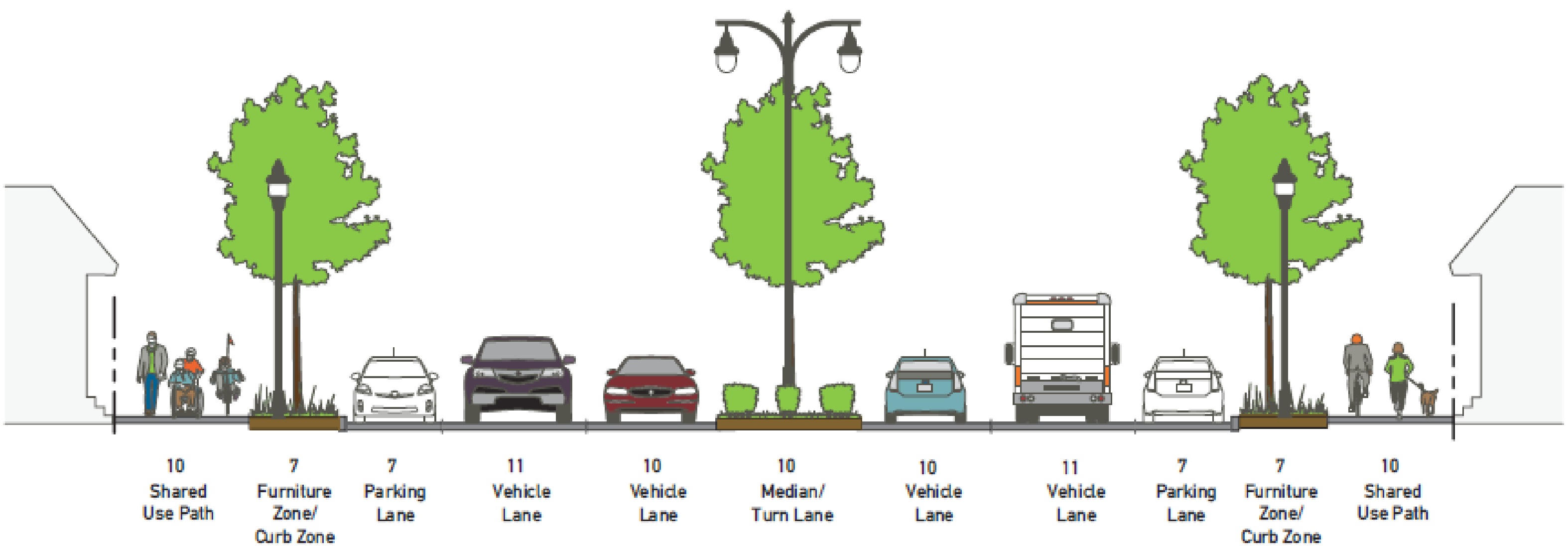
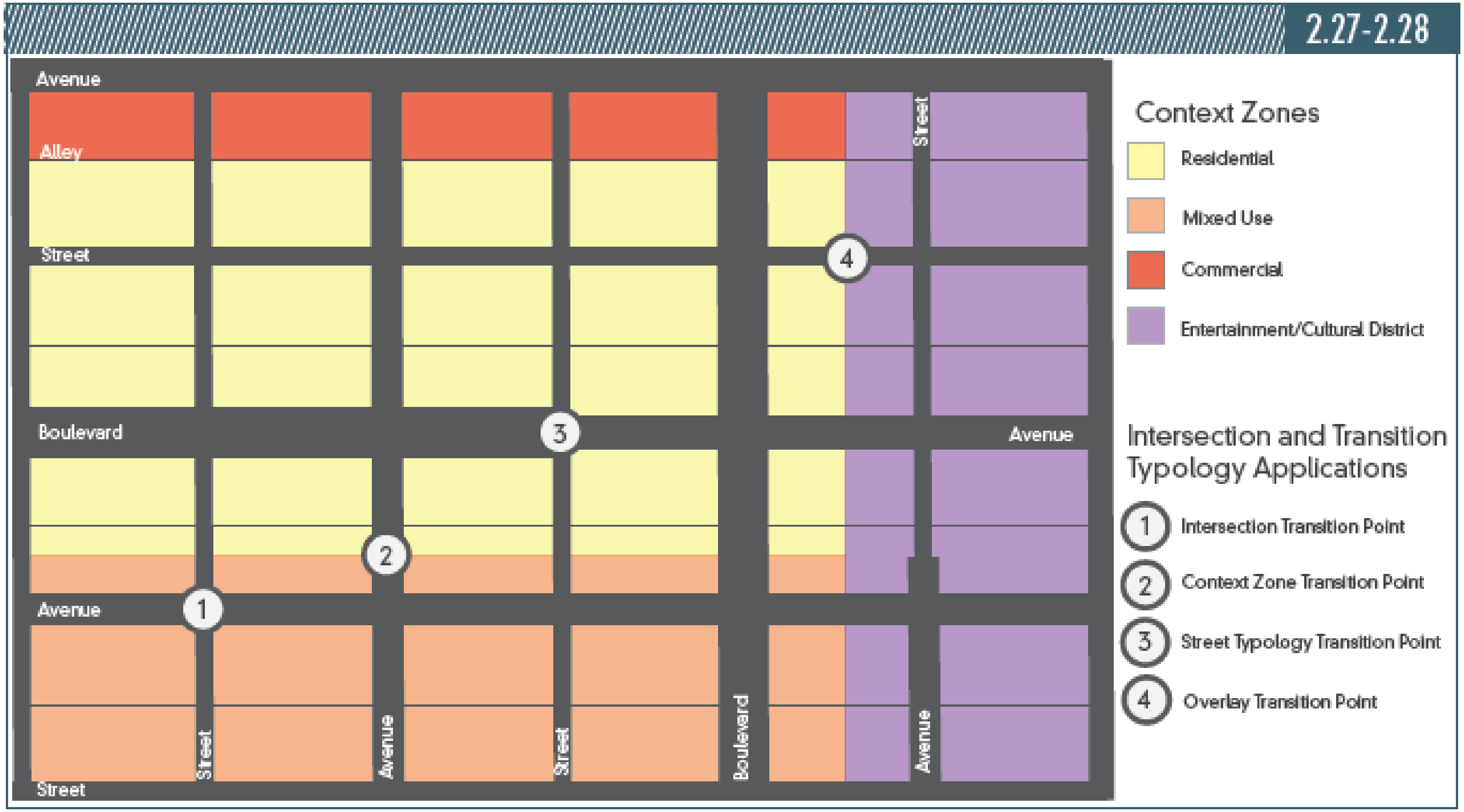


FIGURE 2.27 - 2.28
INTERSECTION AND TRANSITION
Typology Application Illustration



3 CHAPTER 3: GEOMETRICS
COMPONENTS FOR ASSEMBLING COMPLETE STREETS

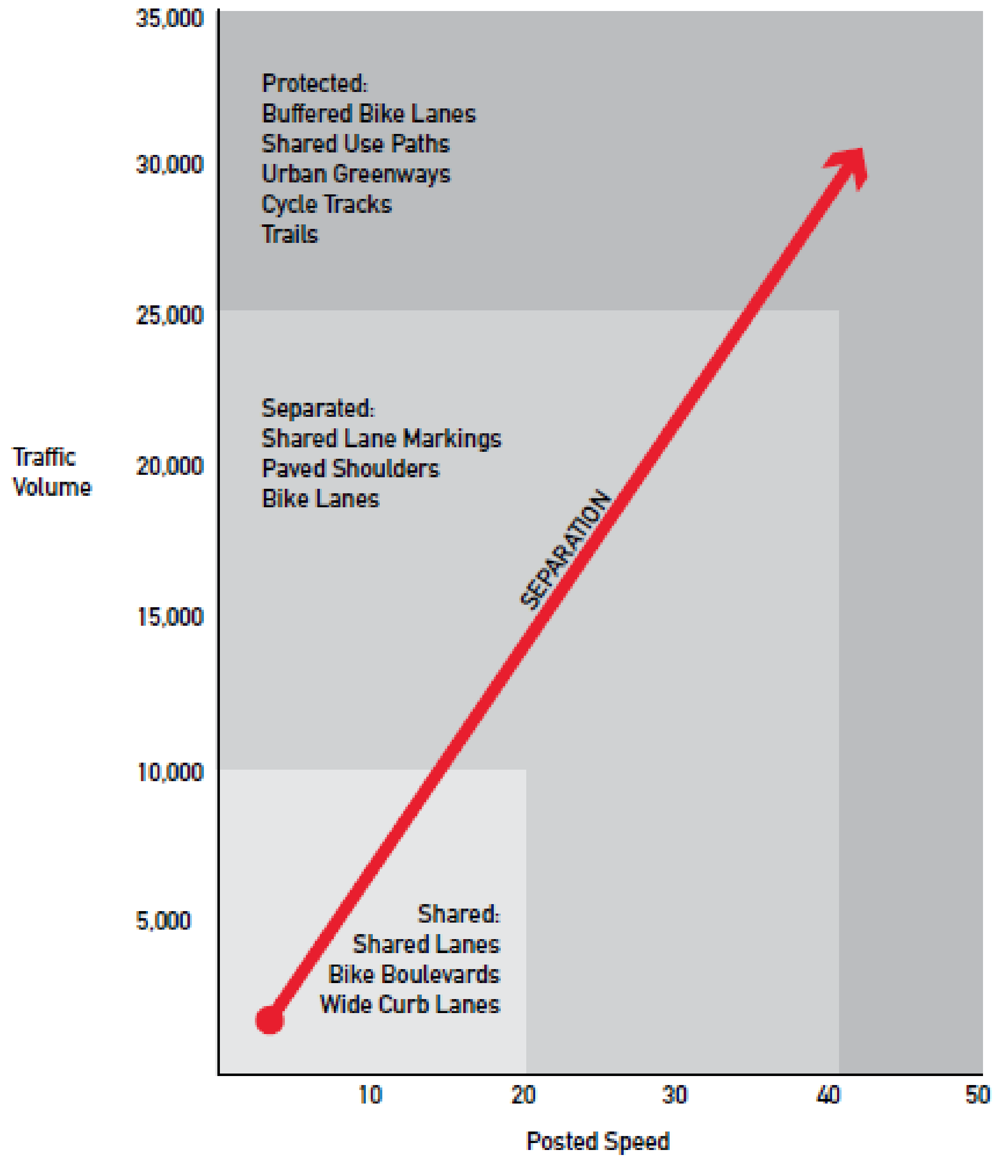
TABLE 3A
PEDESTRIAN WAYS

			Dimensions				Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays for Planned Contexts						
			MIN	Target	MAX	Notes	Commercial/ Mixed Use	Residential	Single Use	Commercial	Residential	Village Mixed-Use	Single Use	Residential/ Agricultural	Village Mixed-Use	Pedestrian Priority Areas	TOD	Entertainment and Cultural Districts	Green Streets	Schools Zones and Campuses	Park Zones	Home Zones/ Social Zones
Getting Started	3.2 Residential Sidewalks	Curb Zone	1	1.5	2	Clear zone for utility and furnishings, not applicable if there is no curb.	—	Required	Permitted	—	Permitted	—	Permitted	Discouraged	—	Required	Required	—	Required	Required	Required	Encouraged
		Furniture Zone	2	6	10	A tree lawn separation area is desired.	—	Required	Permitted	—	Permitted	—	Permitted	Permitted	—	Required	Required	—	Required	Required	Required	Encouraged
		Pedestrian Zone	4	5	8	Unobstructed walking area required.	—	Required	Permitted	—	Permitted	—	Permitted	Permitted	—	Required	Required	—	Required	Required	Required	Encouraged
	3.3 Commercial Sidewalks	Curb Zone	1	1.5	2	Clear zone for utility and furnishings.	Required	—	Permitted	Permitted	—	Required	Permitted	—	Permitted	Required	Required	Required	Required	Required	Required	Encouraged
		Furniture Zone	4	5	6	Furnishing zone for benches and transit shelters etc. Ideally 6 ft. allow for 6 ft. x 6 ft. tree grates.	Required	—	Permitted	Required	—	Required	Permitted	—	Required	Required	Required	Required	Required	Required	Required	Encouraged
		Pedestrian Zone	5	5	10	Consider tree grate surfaces in pedestrian zone.	Required	—	Permitted	Required	—	Required	Permitted	—	Required	Required	Required	Required	Required	Required	Required	Encouraged
		Frontage Zone	1	5	10	Larger frontage zone allows for café seating.	Required	—	Permitted	Permitted	—	Required	Discouraged	—	Permitted	Required	Required	Required	Required	Required	Required	Encouraged
Going the Distance	3.4a Home Zones	Furniture Zone	0	6	10	Same as residential sidewalk. Except in rural and some suburban contexts. Additionally replaces vehicle travel way.	—	Encouraged	Discouraged	—	Encouraged	—	Discouraged	Discouraged	—	Encouraged	Permitted	—	Encouraged	Encouraged	Permitted	—
		Pedestrian Zone	0	5	8	Same as residential sidewalk. Except in rural and some suburban contexts. Additionally replaces vehicle travel way.	—	Encouraged	Discouraged	—	Encouraged	—	Discouraged	Discouraged	—	Encouraged	Permitted	—	Encouraged	Encouraged	Permitted	—
	3.4b Social Streets	Furniture Zone	2	6	10	Same as residential sidewalk. Additionally replaces vehicle travel way.	Permitted	—	Discouraged	Discouraged	—	Permitted	Discouraged	—	Permitted	Encouraged	Permitted	—	Encouraged	Encouraged	Permitted	—
		Pedestrian Zone	5	5	10	Same as commercial sidewalk. Additionally replaces vehicle travel way.	Permitted	—	Discouraged	Discouraged	—	Permitted	Discouraged	—	Permitted	Encouraged	Permitted	Permitted	Encouraged	Encouraged	Permitted	—
		Frontage Zone	1	5	10	Same as commercial sidewalk. Additionally replaces vehicle travel way.	Permitted	—	Discouraged	Discouraged	—	Permitted	Discouraged	—	Permitted	Encouraged	Permitted	Permitted	Encouraged	Encouraged	Permitted	—
	3.5 Green Streets	Furniture Zone	6	8	10	Includes space for rain gardens and drainage swales. Lighting should be LED.	Permitted	Encouraged	Permitted	Permitted	Encouraged	Encouraged	Encouraged	Permitted	Encouraged	Encouraged	Permitted	Permitted	—	Encouraged	Encouraged	Encouraged
		Pedestrian Zone	4	5	8	Clear walking area should be made of pervious materials.	Permitted	Encouraged	Permitted	Permitted	Encouraged	Encouraged	Encouraged	Permitted	Encouraged	Encouraged	Permitted	Permitted	—	Encouraged	Encouraged	Encouraged
		Frontage Zone	1	2	10	Could include space for community gardens.	Permitted	Encouraged	Permitted	Permitted	Encouraged	Encouraged	Encouraged	Permitted	Encouraged	Encouraged	Permitted	Permitted	—	Encouraged	Encouraged	Encouraged
		Median	6	8	12	Includes space for rain gardens and drainage swales. Lighting should be LED.	Permitted	Encouraged	Permitted	Permitted	Encouraged	Encouraged	Encouraged	Permitted	Encouraged	Encouraged	Permitted	Permitted	—	Encouraged	Encouraged	Encouraged
	3.6a Parklets	In Roadway	7	8	8	Replaces parking space. A one space parklet is between 18 and 20 ft.	Encouraged	Encouraged	Discouraged	Discouraged	Discouraged	Permitted	Discouraged	Discouraged	Permitted	Encouraged	Permitted	Encouraged	Encouraged	Encouraged	Encouraged	Encouraged
	3.6b Pavement-to-Parks	In Roadway	Varies	Varies	Varies	Created where there is excess roadway room to repurpose in the pedestrian realm.	Encouraged	Encouraged	Discouraged	Discouraged	Discouraged	Permitted	Discouraged	Discouraged	Permitted	Encouraged	Permitted	Encouraged	Encouraged	Encouraged	Encouraged	Encouraged

KEY: Encouraged | Permitted | Discouraged | Required

Complete the Streets

Tree grates should be placed immediately adjacent to the curb; spacing will depend on the mature size of the selected tree species. Tree grates should be at least 5 feet wide; 6-foot widths are preferable for most trees. In extremely limited spaces where tree grates extend into the pedestrian zone, they can be designed to prevent tripping hazards.



Bicycle Facility Selection: Guidelines for Vehicle Speed & Volume

FIGURE 3.10
WIDE CURB LANES
Chicago, IL

FIGURE 3.11
PAVED SHOULDERS
Palos Heights, IL

WIDE CURB LANES 3.10

Wide curb lanes are 13- to 15-foot-wide vehicle lanes on the outside (curbside) lane of a roadway. Wide curb lanes provide space for a vehicle to pass a bike within the lane. However, wide lanes encourage high speeds, especially over long distances, and 10- to 12-foot lanes are wide enough to allow most vehicles to pass cyclists with minimal encroachment into the adjacent lane. For these reasons, wide curb lanes should be discouraged or used only in combination with shared lane markings, traffic calming, and bicycle wayfinding signs. Where possible, wide curb lanes should be replaced by bike lanes, marked shared lanes, or paved shoulders.

FIGURE 3.25A
BUFFERED BIKE LANES
Chicago, IL

FIGURE 3.25B
BUFFERED BIKE LANES
Minneapolis, MN

FIGURE 3.26A
CYCLE TRACKS
Washington, DC

FIGURE 3.26B
CYCLE TRACKS
Chicago, IL

BUFFERED BIKE LANES 3.25

Buffered bike lanes use a painted buffer area to separate the vehicle travel lane from the bike lane. This buffer, usually 2 to 3 feet wide, can provide sufficient separation to improve cyclists' comfort and safety on heavily traveled arterial corridors. Where there is sufficient space within the curb-to-curb area, buffered bike lanes provide a more affordable solution than a shared-use path. Buffers also can be used between the bike lane and on-street parking, to separate the lane from the door zone.

CYCLE TRACKS 3.26

Cycle tracks are bike lanes separated from vehicle traffic by a curb, rail, or bollards, providing dedicated space for bicyclists who are not comfortable riding on busy streets. Cycle tracks typically are wider than bike lanes, allowing cyclists to ride side-by-side or to pass each other. On corridors with on-street parking, cycle tracks usually are placed between the parking lane and the sidewalk; two-way cycle tracks also can be placed along the center of a roadway. Cycle tracks must be wide enough to allow street sweepers to pass. Cycle tracks require careful implementation at intersecting streets and driveways, where motorists may not see bicyclists entering the roadway from behind parked cars. Colored pavement, mixing zones or exclusive bike signal phasing can be used to increase safety at intersection points. Cycle tracks are most appropriate on high-speed, high-volume roadways in urban and mixed-use settings, where bicycles are a prioritized mode and a regular feature of the transportation environment. Cycle tracks may be less appropriate in suburban settings, where additional separation is easier to achieve via a shared-use path.

TABLE 3B
BICYCLE WAYS

		Dimensions				Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays for Planned Contexts						
		MIN	Target	MAX	Notes	Commercial/ Mixed Use	Residential	Single Use	Commercial	Residential	Village Mixed-Use	Single Use	Residential/ Agricultural	Village Mixed-Use	Pedestrian Priority Areas	TOD	Entertainment & Cultural Districts	Green Streets	Schools Zones and Campuses	Park Zones	Home Zones/ Social Zones
Getting Started	3.8 Signed Routes	9	10	14	Can be used on shared lanes or in combination with bicycle facilities.	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
	3.9 Shared Lanes	9	10	14	Replaces vehicle lane. Paved shoulder, marked shared lane, or bike lane is preferred.	🟠	🟢	🟠	🟠	🟢	🟠	🟠	🟠	🟢	🟢	🟢	🟠	🟢	🟠	🟠	🟢
	3.10 Wide Curb Lane	12	13	14	Less desirable than other types of accommodations; should be replaced by bike lanes, marked shared lanes or paved shoulders.	🔴	🔴	🟠	🟠	🟠	🔴	🟠	🟠	🔴	🔴	🔴	🔴	🔴	🔴	🟠	🔴
	3.11 Paved Shoulder	3	4	5	New AASHTO allows paved shoulders of a minimum 3 ft. with closed drainage in retrofit projects.	🔴	🔴	🟠	🟠	🟠	🟠	🟠	🟢	🟠	🟠	🔴	🔴	🟠	🟠	🟠	🔴
	3.12 Bike Lanes	4	5	6	Include bike lane marking.	🟢	🟠	🟢	🟠	🟠	🟠	🟢	🟠	🔴	🟠	🟢	🟠	🟠	🟠	🟢	🔴
	3.13 Marked Shared Lanes	10	13	14	Marking centered 11 ft. off curb with parking 4 ft. w/o. Place every 50 to 100 ft. preferred; maximum of every 250 ft. on low volume roadways. Place in center of lane if travel lane is 12 ft. or less.	🟢	🟠	🟠	🟠	🟠	🟢	🟢	🟠	🟠	🟠	🟠	🟢	🟠	🟠	🟢	🟠
	3.14 Bike-Bus Lanes	14	15	16	Combine with transitional painting and pavement markings. Allow room for bike and bus to pass frequently.	🟠	🟠	🟠	🔴	🔴	🔴	🔴	🔴	🔴	🟠	🟠	🟠	🔴	🟠	🟠	🔴
	3.15 Shared Use Paths	8	10	12	Replaces the pedestrian zone. Can be 6 ft. with engineering judgement. Also side path.	🔴	🔴	🟠	🟢	🟠	🔴	🟢	🟢	🔴	🟠	🔴	🔴	🟠	🟢	🟢	🔴
	3.16 Trails	8	10	12	Can be 6 ft. with engineering judgement. Can be gravel or limestone.	🔴	🟢	🟠	🟠	🟢	🟠	🟢	🟢	🟠	🟢	🟢	🔴	🟢	🟢	🟢	🔴
Going the Distance	3.17 Floating Bike Lanes	7	7	8	Replaces a parking lane.	🟠	🔴	🟠	🟠	🔴	🔴	🟠	🔴	🔴	🔴	🟠	🔴	🟠	🟠	🟠	🔴
	3.18 Advisory Bike Lanes	4	5	6	Dashed line space shared with part of a vehicle lane.	🟠	🟢	🟠	🔴	🟢	🔴	🟠	🔴	🔴	🟠	🟢	🟠	🟢	🟠	🟢	🟠
	3.19 Bike Boulevards and 3.20 Neighborhood Greenways	9	10	13	Replaces vehicle lane. Include bike boulevard marking.	🔴	🟢	🟠	🔴	🟢	🟠	🟠	🟠	🟠	🟠	🟢	🔴	🟢	🟢	🟢	🔴
	3.21 Contraflow Bike Lanes	4	5	6	Include bike lane marking and signs.	🟠	🟢	🟠	🔴	🟠	🟠	🟠	🔴	🟠	🟠	🟢	🟠	🟠	🟠	🟠	🔴
	3.22 Left Side Bike Lanes	4	5	6	Include bike lane marking and signs.	🟢	🟠	🟠	🔴	🔴	🟠	🟠	🔴	🟠	🟠	🟢	🟠	🟠	🟠	🟠	🔴
	3.23 Colored Pavement Bike Lanes	4	5	6	Pavement color should be green. Include bike lane marking and signs.	🟢	🟠	🟠	🟠	🔴	🟠	🟠	🔴	🟠	🟠	🟢	🟠	🟢	🟢	🟢	🔴
	3.24 Buffered Bike Lanes	6	7	9	Buffer of 2-3 ft. Maximum may be higher if larger buffer is required due to right-of-way dimensions.	🟠	🟠	🟢	🟢	🟠	🔴	🟢	🟠	🔴	🟠	🟢	🔴	🔴	🟠	🟢	🔴
	3.25 Double Bike Lanes	8	9	10	Facilitates passing movements where bicycle volumes are high; also provides buffer.	🟢	🟠	🟢	🟠	🔴	🔴	🟢	🟠	🔴	🟠	🟠	🔴	🔴	🟠	🟢	🔴
	3.26 Cycle Track – Inside Parking	7	8	9	Parking zone is the separation. Includes 1 to 3 ft. buffer to passenger side door zone. 14 ft. minimum with parking.	🟢	🟠	🟠	🔴	🔴	🟠	🟠	🔴	🟠	🟠	🟢	🟠	🟠	🟠	🟠	🔴
	One direction	6	8	10	Buffer of 2-3 ft. Maximum may be higher if larger buffer is required due to right-of-way dimensions.	🟢	🟠	🟠	🔴	🔴	🟠	🟠	🔴	🟠	🟠	🟢	🟠	🟠	🟠	🟠	🔴
	Two direction	8	10	15	Buffer of 2-3 ft. Maximum may be higher if larger buffer is required due to right-of-way dimensions.	🟠	🟠	🟢	🔴	🔴	🟠	🟠	🔴	🟠	🔴	🟢	🟠	🟠	🟠	🟢	🔴
	Center	10	14	16	Buffer of 2-3 ft. on each side. Maximum may be higher if larger buffer is required due to right-of-way dimensions.	🟠	🔴	🟠	🔴	🔴	🔴	🟠	🔴	🔴	🟠	🟠	🟠	🟠	🟠	🟠	🔴
	3.27 Urban Greenways	8	10	14	Created in pedestrian realm, can be shared with pedestrian zone or adjacent to pedestrian zone.	🟢	🟠	🟠	🟠	🔴	🟢	🟠	🔴	🟠	🟠	🟢	🟢	🟢	🟠	🟢	🟠

Complete the Streets

FIGURE 3.40A
CTA PUBLIC TRANSIT
Chicago, IL

FIGURE 3.40B
LIGHT RAIL TRANSIT
Minneapolis, MN

FIGURE 3.40C
METRA COMMUTER
RAIL TRANSIT
Elgin, IL

FIGURE 3.41
HIGH OCCUPANCY
VEHICLE LANES
Toronto, Canada
Image Credit:
Jess Fizscy


3.40A


3.40B


3.40C

RAIL TRANSIT 3.40

Light rail, heavy rail, and other forms of rail transit typically run outside of the roadway network and are for the most part beyond the scope of this manual. However, coordinating bicycle network access and pedestrian facilities with rail transit stations is a priority for Complete Streets networks.

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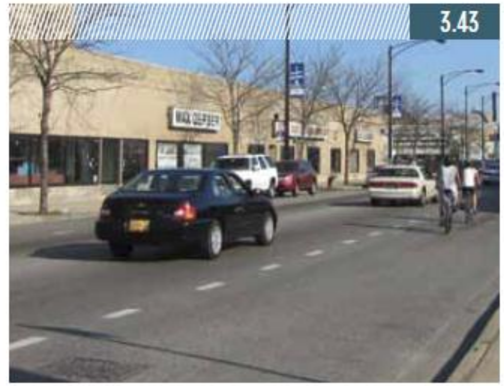
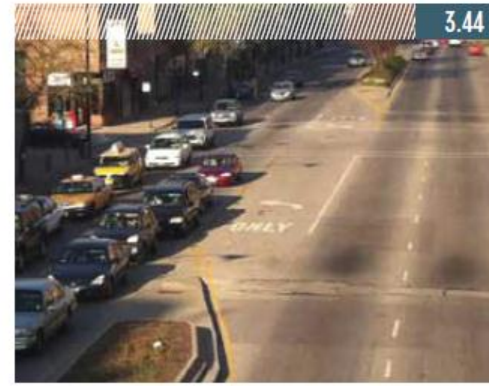
FIGURE 3.43
VEHICLE LANES
Chicago, IL

FIGURE 3.44
TURNING LANES
Chicago, IL

FIGURE 3.45
PARKING LANES
Chicago, IL


3.43


3.44

VEHICLE LANES 3.43

Vehicle lanes are suitable for all vehicles that use the roadway system. Too often, however, roadways are designed to prioritize trucks and other larger vehicles, even though the majority of users are in smaller vehicles. As a result, space within the right-of-way is allocated to create wider vehicle lanes instead of improving pedestrian and bicycle accommodations. This manual recommends a target vehicle lane width of 10 feet to maximize multimodal comfort. The outside lanes on transit ways and truck routes can be expanded to a width of 11 feet to accommodate larger vehicles, with a maximum design width of 12 feet for a standard vehicle lane. On local/low-volume two-way roadways, minimum lane widths of 8 to 9 feet are acceptable.

TURNING LANES 3.44

Turning lanes can be placed in medians or parking lanes. Two-way left-turn lanes are acceptable but not desirable; medians with structured turning movements are preferred. Design should support turning speeds under 15 mph. Two-way left-turn lanes are appropriate if used to reduce vehicle lanes, via a road diet.


3.45

PARKING LANES 3.45

On-street parking slows traffic and facilitates access to adjacent land uses. Parallel parking is most common, but angled parking is an option where parking demand is high. Back-in angled parking is the preferred choice, because car doors open to direct exiting passengers toward the sidewalk, motorists can access car trunks from the curb, and drivers have a better view of bicycle and vehicle traffic when re-entering the travel way. The creation of transit ways, on-street bike facilities, and sidewalk expansion sometimes can be accommodated by creative redesign of on-street parking. In a constrained right-of-way, it may be necessary to consider removing parking lanes to prioritize other modal accommodations.

Active Intersection Treatments

Design characteristics at intersections with co
where bicycles and pedestrians are prioritize
should focus on the needs of walkers and bi
This section focuses on specific improvemen
for bicycles and pedestrians. (See section 1.4
for basic coordination measures that improv
intersection function, such as tightening turni
radii standards and reducing lane widths.)

TABLE 3E PEDESTRIAN TREATMENTS

		Dimensions	Design Considerations	Guideline	Notes
Crosswalk Variations	Transverse Lines	Lines 6 to 24 in. wide. Spacing 6 ft. wide minimum. Should be as wide as approaching sidewalk.	Lines should extend across entire roadway and can connect to lines of intersecting roadways crosswalk.	Should be used at signalized and controlled intersections to indicate proper crossing location. Can be used at uncontrolled and midblock crossings as determined by study. Markings should be located so as to center curb ramps within the crosswalk.	Edgelines are the minimal crosswalk treatment.
	Longitudinal or Diagonal Lines	Lines 12 to 24 in. wide with 12 to 60 in. gaps. Spacing 6 ft. wide minimum. Should be as wide as approaching sidewalk.	Gap between lines should not exceed 2.5 times the width of the line. Gaps should be placed to align with wheel base of vehicles.	Should be used at signalized and controlled intersections to indicate proper crossing location. Can be used at uncontrolled and midblock crossings as determined by study. Markings should be located so as to center curb ramps within the crosswalk.	Longitudinal markings are the preferred crosswalk treatment. 24 in. wide markings do not need a supplemental edge line.
	Custom	Spacing 6 ft. wide minimum. Should be as wide as approaching sidewalk.	Crosswalks can be created with bricks, pavers, or thermoplastic.	Should be used at signalized and controlled intersections to indicate proper crossing location. Can be used at uncontrolled and midblock crossings as determined by study. Markings should be located so as to center curb ramps within the crosswalk.	Custom designs should be supplemented with a 24 in. wide edge line to improve visibility. Line can be implied through color variations by using complementary materials.
	Pedestrian Scramble and Diagonal Crossings	Same as for transverse lines. Custom designs can be created to inscribe the entire intersection.	Interior transverse lines should not connect, but be angled at curb ramps to support the diagonal crossing movement. Inside markings and custom designs are permitted.	Signal must include an exclusive pedestrian phase timed for the longest crossing distance at 3.5 ft. per second. 3 ft. per second may be used in highly prioritized pedestrian areas.	—
Unsignalized	Stop Signs	Standard R1-1 stop sign as defined by MUTCD.	Use at unsignalized intersections within signalized areas.	Use at unsignalized intersections within signalized areas, intersections of minor roads with major roads or designated highways. Also consider on minor roads where multimodal volumes exceed 2000 units per day, sight is limited or obstructed, and crashes are caused by failure to yield (3 within 5 yrs. or 2 within 3 yrs.).	—
	Signed	Preferred signs included R1-5b, R1-6a, and W11-15 with W16-7p and W16-9p as defined by MUTCD.	Pedestrian crossing warning signs and must stop for pedestrian signs are considered a controlled crossing. R1-5b should be placed where vehicles are expected to stop. W11-15/W16-7p should be placed where pedestrians (and bicyclists) are expected to cross. W11-15/W16-9p should be placed within 300 ft. of the crossing.	Use where transit routes or pedestrian destinations support crossings, or where residents have requested crossing improvements but signal or stop sign warrants/guidance has not been met.	Crosswalks are encouraged at signed crossings but not required.
	Mid-Block	Same as crosswalks and/or signed crossings.	Mid-block crossings should include crosswalks and median crossing islands on 4-lane roads. Mid-block crossings can be signed or even signalized if warrants are met.	Midblock crossings should be used in combination with transitional infrastructure features to heighten driver awareness. They should not be used alone on 4 lane roadways where vehicle speeds exceed 40 mph and ADT exceeds 12,000 or 15,000 with a raised median/crossing island.	Engineering study should be conducted when installing. Consider number of lanes, pedestrian volumes, roadway speed, potential to accommodate crossings, medians, geometry and lighting.
Crossing Islands	Traditional	Varies; minimum 5 to 6 ft. in width to allow for a wheel chair to sit in the island.	Can be used on bus routes. Requires clear bicycle accommodations on bike routes.	ADT < 20,000 Speed limit of ≤ 30 mph	Can be designed with offset entrances to encourage drivers and pedestrians to face each other.

Complete the Streets

FIGURE 3.53A
MINI-ROUNDABOUT
Chicago, IL

FIGURE 3.53B
MINI-ROUNDABOUT
Seattle, WA

FIGURE 3.54
CIRCULAR INTERSECTIONS
Normal, IL
Image Credit: Scott Shigley; Courtesy of Farr Associates

CIRCULAR INTERSECTIONS 3.54

Circular intersections are a variation on single-lane urban roundabouts and are suited commercial/mixed use contexts, with traffic volumes of below 5,000 to 10,000 ADT. Circular intersections allow/encourage pedestrians and bicyclists to use the center of the circle.

MINI-ROUNDABOUTS & MINI-TRAFFIC CIRCLES 3.53

A mini-roundabout is a smaller version of the traditional modern roundabout, with a fully mountable center island that can be driven over by emergency vehicles and occasional buses or large trucks, when necessary. Mini-traffic circles are similar, small circular islands placed in the center of intersections to calm traffic.

Complete the Streets

SIGNS 3.59

Signs are an effective way to welcome, alert, inform and direct users, especially at transition points. The MUTCD contains guidelines for signage use in the transportation network, including pedestrian and bicycle signs. Some special districts use distinctive wayfinding signs, interpretive placemaking signs and banners to provide necessary user information and convey a sense of local identity.

3.59A

FIGURE 3.59A
WAYFINDING SIGNS
Chicago, IL

3.59B

FIGURE 3.59B
IDENTITY SIGNS
Chicago, IL

3.59C

FIGURE 3.59C
MODE TRANSITION
SIGNS
St. Louis, MO

Complete the Streets

INFRASTRUCTURE FEATURES (CONTINUED) 3.60

FIGURE 3.60D
CHICANES
Chicago, IL

CHICANES

Chicanes are planted areas, curb extensions and/or medians that create horizontal deflection on roadways, requiring users to slow down to negotiate the bends in the lane. Chicanes should not be used on streets with bus transit service

FIGURE 3.60E
SPEED HUMPS
Chicago, IL

SPEED HUMPS AND SPEED LUMPS

Speed humps and speed lumps are raised pavement areas in the travel way that require drivers to slow down. Speed humps and speed lumps are most often used in pedestrian priority areas. Speed humps should be clearly marked and should be avoided in bicycle priority areas and on streets with bus transit service. Speed Lumps are speed humps with gaps to accommodate the wheel base of emergency service vehicles or buses. Speed lumps can also have gaps to accommodate bicyclists.

FIGURE 3.60F
RAISED CROSSWALK
Oak Park, IL

RAISED CROSSWALKS AND INTERSECTIONS

Similar to a speed hump, a raised crosswalk or intersection brings the roadway pavement to sidewalk level at pedestrian crossings to facilitate walking and reduce vehicle speeds. This technique works best in pedestrian priority areas and should be combined with complementary pedestrian infrastructure. Raised crosswalks should not be used on streets with transit service.

Complete the Streets

FIGURE 3.64
ACCESSIBLE PEDESTRIAN SIGNAL
Chicago, IL

FIGURE 3.65A
BIKE TRAFFIC SIGNALS
New York, NY

FIGURE 3.65B
BIKE TRAFFIC SIGNALS
Amsterdam, Netherlands

3.64

ACCESSIBLE PEDESTRIAN SIGNALS (APS) 3.64

An accessible pedestrian signal (APS) provides audio and vibro-tactile cues to identify the pushbutton location and indicate the WALK interval for pedestrians with visual disabilities. To ensure ease of use, these devices must be installed in accessible locations, immediately adjacent to the sidewalk at the crosswalk area.

3.65A

3.65B

BIKE-ONLY SIGNALS 3.65

Bike-only signals can be used in areas with high volumes of bike traffic or on special bike facilities, such as cycle tracks or urban greenways. These signals display the traditional green-yellow-red colors of vehicular signals, with bicycle symbols on the signal faces.

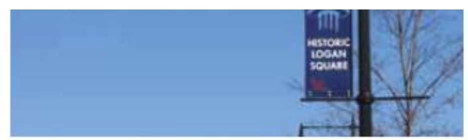
4 CHAPTER 4: AMENITIES COMPONENTS FOR POPULATING COMPLETE STREETS

FIGURE 4.1
PEDESTRIAN SCALE LIGHTING
Chicago, IL

FIGURE 4.2A
VEHICLE SCALE LIGHTING
Chicago, IL

TABLE 4A LIGHTING						Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays For Planned Contexts						
Getting Started	Design Type	STYLE OPTIONS	DIMENSIONS	SPACING	DESIGN CONSIDERATIONS	COMMERCIAL/ MIXED USE	RESIDENTIAL	SINGLE USE	COMMERCIAL	RESIDENTIAL	VILLAGE MIXED-USE	SINGLE USE	RESIDENTIAL/ AGRICULTURAL	VILLAGE MIXED-USE	PEDESTRIAN PRIORITY AREAS	TOD	ENTERTAINMENT AND CULTURAL DISTRICTS	GREEN STREETS	SCHOOLS ZONES AND CAMPUSES	PARK ZONES	HOME ZONES/ SOCIAL ZONES
	4.1 Pedestrian Scale	Straight pole	12-17 ft. H	20 ft. to 40 ft.	Lamps: acorn, globe, lantern, historic																
		Arm	4 ft. L	20 ft. to 40 ft.	Width of sidewalk																
		Dual arm	8 ft. L	20 ft. to 40 ft.	Presence of bikeway or on-street parking																
	4.2 Vehicle Scale	Pole	27 ft.-30 ft. H	40 ft. to 80 ft.	Lamps: shoe box, historic																
		Arm	4 ft.-8 ft. L	40 ft. to 80 ft.	Lamps: cobra, historic. Width of travel way for arm length.																
		Dual arm	8 ft.-16 ft. L	40 ft. to 80 ft.	Median: width of travel way for arm length																
	4.3 Combination	Dual arm	4 ft.-12 ft. L	40 ft. to 80 ft.	Ped arm placed at 12 ft.-17 ft. Width of travel way for arm length																
Going the Distance	4.4a Solar Lamps		Same as conventional	Same as conventional	Lamps can replace conventional																
	4.4b LED Lamps		Same as conventional	Same as conventional	Lamps can replace conventional																
	4.5 In-Pavement Lighting		Varies	Varies	District identity																
	4.6 Custom Design		Varies	Varies	District identity																
	4.7 Catenary		Varies	Varies	District identity																

crime, and makes pedestrians more visible to drivers. Pedestrian-scale lighting also can illuminate bikeways near walking areas. Retrofits of existing streetlights and new installations should provide lighting on sidewalks and multi-use paths. Pedestrian-scale lighting should be coordinated with building and property owners to include building-mounted lighting for sidewalks, alleys, paths, and stairways where poles would obstruct the pedestrian zone. Land use context should be considered to achieve optimum lighting levels in pedestrian areas, and care must be taken to avoid light trespass into the windows of nearby residential units. Common examples of pedestrian-scale lighting include acorn, globe, and lantern lamps.



VEHICLE-SCALE LIGHTING 4.2

Vehicle-scale lighting is an important element in streetscapes. In certain contexts, pedestrian-scale lighting is sufficient to provide adequate lighting for safe and secure walking, bicycling and driving. On major roadways, however, vehicle-scale lighting is needed to illuminate the travel way. Vehicle-scale lighting should be located in the furnishing zone and should never block the pedestrian way.

FIGURE 4.8A
BENCHES
Chicago, IL

FIGURE 4.8B
BENCHES
Oak Park, IL

FIGURE 4.9
RECYCLE RECEPTACLES
Chicago, IL

PUBLIC SEATING 4.8

Benches and other seating areas are essential elements of the walking environment, providing comfortable places for people to rest, eat, socialize, or read in a public space. A properly sited bench creates a sense of place for the immediate surrounding area. Some considerations for the design and placement of benches include:

Seating should be located under trees or other shaded areas, with adequate lighting nearby.

Seating should be oriented toward points of interest, such as adjacent buildings, open spaces, or the street itself. Where sidewalk width permits, seating can be perpendicular to the curb.

Informal seating areas, such as low planter walls, wide stairways or other architectural elements, may be used as alternatives to freestanding benches. Benches and other seating should be made of durable, high-quality materials and designed in a style that integrates with other streetscape elements and visually complements and reinforces the streetscape design.

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recyclable m
the location c

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civic institution**

**Place receptac
pedestrian zon**

**Refuse recepta
along commer**

BIKE PARKING 4.14

This section discusses the three primary types of bike parking: on-street, on-sidewalk, and off-street. (A fourth type, covered bike parking, is discussed in the "Going the Distance" section.)

ON-STREET

On-street bike parking, sometimes called a "bike corral," uses an on-street parking space for bike racks. Up to 12 bike racks can be placed in a single motor vehicle space, maximizing the effective customer parking area in business and office districts. On-street bike parking can be considered in areas where sidewalk space is limited or in spaces unusable by motor vehicles, including areas near intersections and crosswalks.

SIDEWALK

The best choices for sidewalk bike parking are inverted-U or ring designs, which maximize the potential locking area and can stand alone or be grouped together. Sidewalk bike parking structure designs can be integrated with the design aesthetic of other street furnishings and public art. Sidewalk bike racks should be placed in the frontage or furniture zones, so bicyclists using them do not interfere unduly with building access or the pedestrian zone. Sidewalk bike parking structures can do double duty by substituting for bollards.

OFF-STREET

Off-street racks should be located within clear view of a destination's entranceway, preferably no further than the closest motor vehicle parking space and usually no more than 50 feet from the entrance. Multiple racks in a visible, signed location can be placed up to 100 feet from the entrance. When off-street racks are placed far from entranceways, cyclists tend to ignore them and find closer places to secure their bikes.

FIGURE 4.14A
ON-STREET BIKE PARKING
Chicago, IL

FIGURE 4.14B
ON-STREET BIKE PARKING
Oak Park, IL

FIGURE 4.14C
SIDEWALK BIKE PARKING
Chicago, IL

FIGURE 4.14D
OFF-STREET RACKS
Chicago, IL

FIGURE 4.22B
TREE SPACING
Oak Park, IL

FIGURE 4.22C
PARKWAY
Oak Park, IL

TREE ROWS & PLANTINGS (CONTINUED) 4.22

TREE SPACING

Optimally, trees should be placed every 20 to 40 feet and intermingled with street lighting and utilities, but spacing between trees will vary with species and site conditions. In general, tree spacing should be 10% less than mature canopy spread; closer spacing of large trees is encouraged to create an interlaced canopy. Trees planted in groups and groves create a microclimate more favorable for growth, as isolated trees are exposed to heat and desiccation from all sides. On residential streets where lots are 40 or 50 feet wide, at least one tree should be planted on each lot between driveways. Where constraints prevent even spacing of trees, it is preferable to place a tree slightly off the desired rhythm than to leave a gap in the pattern. Trees should not be eliminated to create a uniform pattern.

PARKWAY OR TREE LAWN

In a parkway or tree lawn, (also known as a planting strip, boulevard, or terrace), the entire furniture zone is dedicated to trees and plantings, creating an optimal environment for a healthy tree row. Parkways are most suited to residential streets but also can be found in commercial areas in suburban settings.


4.25A

4.25B


4.25C


4.25D


4.25E


4.25F

FIGURE 4.25A
BICYCLE AND PEDESTRIAN CROSSING SIGNS
Chicago, IL

FIGURE 4.25B
BIKE SYSTEM SIGNS
Chicago, IL

FIGURE 4.25C
BIKE SYSTEM SIGNS
Chicago, IL

FIGURE 4.25D
PEDESTRIAN CROSSING SIGN
Oak Park, IL

FIGURE 4.25E
BICYCLE ROUTE TURNING SIGNS
Chicago, IL

STREET SIGNS 4.25

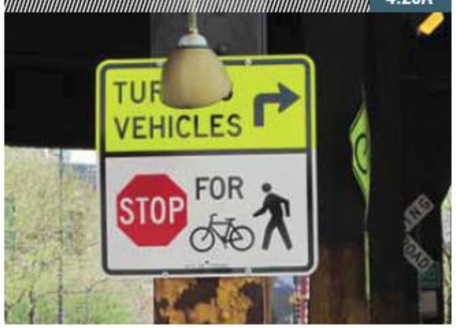
Best practices for street signs are included in the MUTCD. When placing signs for multimodal transportation corridors, the following principles should be considered:

Signs for motor vehicles should also be visible and usable by bicyclists and pedestrians, where appropriate; for example, street name signs should face both directions at intersections of one-way streets, for pedestrian use.

Pedestrian warning signs are important at unsignalized crossings, to caution drivers to look for people crossing the street.

Bicycle signs can be used for wayfinding and regulatory purposes, and also help to raise motorists' awareness of bicyclists. Bicycle wayfinding signs should include the destination, distance, and direction. Regulatory signs inform bicyclists, pedestrians and motorists about rules and regulations for safe cycling and shared use. The MUTCD includes specifications for bicycle wayfinding, regulatory, and warning signs.

4.25A



4.25B

4.27B

4.27D

4.27C

4.27E

4.27F

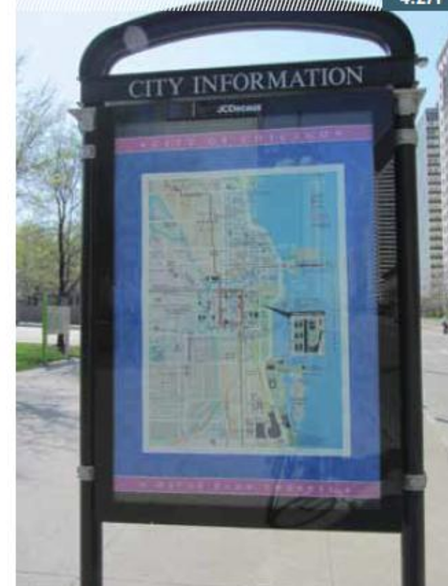


FIGURE 4.27B
BANNERS
New York, NY

FIGURE 4.27C
HISTORICAL MARKERS
Oak Park, IL

FIGURE 4.27D
NEIGHBORHOOD MURALS
Chicago, IL

FIGURE 4.27E
INFORMATIONAL KIOSK
Chicago, IL

FIGURE 4.27F
INFORMATIONAL KIOSK
Chicago, IL

PLASTICS 4.32

Plastic products can be resilient, strong, and colorful, making them useful for creating placemaking designs in the streetscape. Thermoplastics, which use heat to bond plastics into asphalt and concrete, can be used to mark pavements, decorate crosswalks (along with required white lanes) or to add stencils to roadways and sidewalks. Long-lasting colored plastics are commonly used instead of paints to create colored bike lanes, bike boxes, or bike through-lanes. Recycled plastic (or rubber) sidewalks can be used instead of concrete, allowing for easy replacement of single segments and easy access for maintenance issues, such as tree route trimming and drainage pipe repair. As plastics become more commonly used materials in roadway construction, there will be new opportunities to test various applications.

4.32A

4.32B

FIGURE 4.32A
THERMOPLASTIC
BIKE LANE
Chicago, IL

FIGURE 4.32B
THERMOPLASTIC
PLASTIC CROSSING
Indianapolis, IN
Credit: Storrow
Kinsella Associates
storrowkinsella.com

5 CHAPTER 5: PROCESS
IMPLEMENTING THE COMPLETE STREETS NETWORK

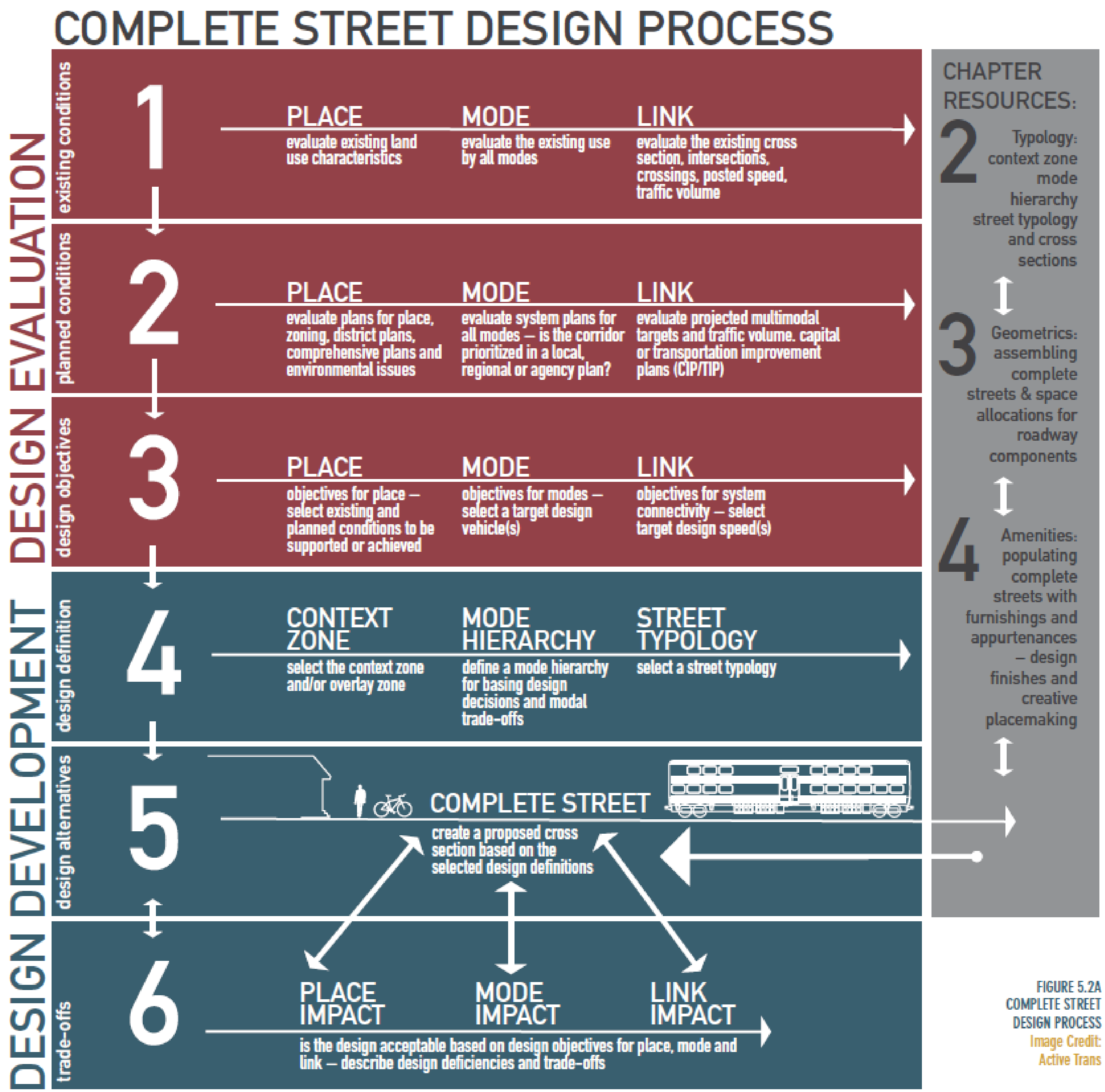


FIGURE 5.2A
COMPLETE STREET
DESIGN PROCESS
Image Credit:
Active Trans

STEP 1: EXISTING CONDITIONS

PROJECT NAME: ______________________________ PROJECT MANAGER: ________

AGENCY: ______________________________ PROJECT AREA & BOUNDARIES: ________

PLACE

DEVELOPMENT PATTERN

CHARACTER OF THE AREA:

☐ Rural ☐ Suburban ☐ Urban

Population Density: ______________

Avg. Block Length: ______________

NETWORK CHARACTERISTICS:

☐ Traditional Urban Grid

☐ Conventional Suburban

LAND USE

LAND USE MIX:

☐ Residential: ______________

☐ Commercial: ______________

☐ Mixed Use: ______________

☐ Single Use: ______________

DISTRICT

CLASSIFICAT

RELATED OR

LIST NEARBY DESTINATIONS

(e.g., schools, parks, trails, retail centers, transit stations, office

____

____

MODE

SITE VISITS

DATE/TITLE FINDINGS

____

____

____

____

TRANSIT SERVICE

CLASSIFICATIONS, SITE PLANS, RELAT

____

____

____

____

TRAVEL MODES USED:

☐ Pedestrian ☐ Bicycle ☐ Private Vehicles ☐ Freight

☐ High Occupancy Vehicles ☐ Recreational Vehicles

☐ Farm Equipment ☐ Equestrian ☐ Other: ____________

TRANSPORTATION STUDIE

On existing transit route? ☐ Yes

Within ¼ mile of bus stop? ☐ Yes

Within ½ mile of rail stop? ☐ Yes

Within 3 miles of rail stop? ☐ Yes

PROJECT AREA CRASH AVERAGES

Motor Vehicle Crashes: __________ Data Year(s): __________

Bicycle Crashes: __________ Data Year(s): __________

Pedestrian Crashes: __________ Data Year(s): __________

Other incidents: __________ Data Year(s): __________

Hot Spots: ______________________________

BIKEWAYS CONNECTIVITY

No. of direct on-street bikeways co

No. of on-street bikeways within 3 m

No. of direct off-street trail connectio

No. of off-street trail connections wit

LINK

Jurisdiction: ____________

Agency Contact: ____________

____

____

Total ROW Width: ______

Curb-to-curb Width: ______

Posted Speed: ______

Typical Vehicle Speed at 85th Percentile: ______

Bridges/Underpasses: ______

Average Daily Traffic: ________

Multi-modal Level of Service: ________

Pedestrian Level of Service: ________

Bicycle Level of Service: ________

Vehicle Level of Service: ________

F

☐

☐

☐

☐

PROPOSED CROSS SECTION WORKSHEET, CONTINUED

DIRECTION 1: ☐ N. BOUND ☐ S. BOUND ☐ E. BOUND ☐ W. BOUND

BICYCLE WAYS	Y/N	ft.
Shared Use Path Use: ☐ Bike ☐ Ped ☐ Equestrian ☐ Other_______		
Trail Use: ☐ Bike ☐ Ped ☐ Equestrian ☐ Other_______		
Shared Lane		
Paved Shoulder		
Wide Curb Lane		
Signed Route		
Bike Lane		
Marked Shared Lane		
Bike-Bus Lane		
Bike Boulevard/Neighborhood Greenway		
Contraflow Bike Lane		
Left Side Bike Lane		
Colored Pavement Bike Lane		
Buffered Bike Lane		
Double Bike Lane		
Cycle Track Inside Parking		
Cycle Track One Direction		
Cycle Track Two Direction		
Cycle Track Center		
Urban Greenways		
Floating Bike Lane		
Advisory Bike Lane		
Other:		
TRANSIT WAYS		
Bike-Bus Lanes		
Dedicated Lanes		
Separated Lanes		
Bus Rapid Transit		
HOV Lanes		
Rail-Transit		
Modern Streetcars		
Green Lanes		
Other:		

VEHICLE/TRAVEL LANES	qty.	ft.	ft.	ft.	ft.
Vehicle Lanes					
Turning Lanes					
Parking Lanes					
Other:					

DIRECTION 2: ☐ N. BOUND ☐ S. BOUND ☐ E. BOUND ☐ W. BOUND

BICYCLE WAYS	Y/N	ft.
Shared Use Path Use: ☐ Bike ☐ Ped ☐ Equestrian ☐ Other_______		
Trail Use: ☐ Bike ☐ Ped ☐ Equestrian ☐ Other_______		
Shared Lane		
Paved Shoulder		
Wide Curb Lane		
Signed Route		
Bike Lane		
Marked Shared Lane		
Bike-Bus Lane		
Bike Boulevard/Neighborhood Greenway		
Contraflow Bike Lane		
Left Side Bike Lane		
Colored Pavement Bike Lane		
Buffered Bike Lane		
Double Bike Lane		
Cycle Track Inside Parking		
Cycle Track One Direction		
Cycle Track Two Direction		
Cycle Track Center		
Urban Greenways		
Floating Bike Lane		
Advisory Bike Lane		
Other:		
TRANSIT WAYS		
Bike-Bus Lanes		
Dedicated Lanes		
Separated Lanes		
Bus Rapid Transit		
HOV Lanes		
Rail-Transit		
Modern Streetcars		
Green Lanes		
Other:		

VEHICLE/TRAVEL LANES	qty.	ft.	ft.	ft.	ft.
Vehicle Lanes					
Turning Lanes					
Parking Lanes					
Other:					

NOTES:

AASHTO POLICY ON THE GEOMETRIC DESIGN OF HIGHWAYS AND STREETS (THE GREEN BOOK) 5.5

The Green Book provides guidance for design elements such as geometric alignment, street width, lane width, shoulder width, medians, curbs, and other features. FHWA has determined that the Green Book applies to all streets receiving Federal funding, including streets and roads that are part of the National Highway System (NHS). The NHS includes the Interstate Highway System, principal routes connecting to those highways, and roads important to strategic defense; in total, the NHS comprises about 4% of all roadway miles.

It is important to note that the Green Book provides guidance that states and cities often unnecessarily treat as standards. The Green Book actually encourages flexibility in design within certain parameters, as evidenced by the AASHTO publication, A Guide for Achieving Flexibility in Highway Design. For example, many jurisdictions prohibit 10-foot lane widths, citing concerns about deviating from federal standards; in fact, 10-foot lanes are allowed under AASHTO guidelines.

VERTICAL ALIGNMENT

The Green Book provides acceptable values for designing vertical curves for streets. The values used in vertical curve design should be selected based on the selected target speed appropriate to the street context. Using higher values can contribute to increased vehicle speeds and may require increased modification to the natural terrain, increasing negative environmental impacts.

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STOPPING SIGH

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INTERSECTION S

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yielding at a stop sign
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motorists can be expe
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before crossing or tur
provided by the two-s
of on-street parking cl

HORIZONTAL CLEARANCE/CLEAR ZONE

Horizontal clearance is the lateral distance from a specified point on the roadway, such as the edge of the travel lane or curb face, to a roadside feature or object. The clear zone is a relatively flat, unobstructed area provided for errant vehicles.

Horizontal clearance based on clear zone requirements for rural highways is not practical in urban areas characterized by more bicyclists and pedestrians, lower speeds, denser abutting development, restricted right-of-way, and closer-spaced intersections and access points. Urban streets with curbs and gutters do not have sufficiently wide roadsides to provide clear zones. In urban areas, the minimum horizontal clearance is 1.5 feet, measured from the face of the curb. The minimum horizontal clearance on urban streets is primarily intended to facilitate normal operation; for example, clearance is required for sign posts and poles, to make sure they are not hit by car doors and large vehicles with overhangs maneuvering close to the curbside.

PEDESTRIAN GUIDE AND BICYCLE GUIDE

AASHTO also publishes guides specifically for the development of pedestrian and bicycle facilities. The Guide for the Development of Bicycle Facilities and the Guide for the Development of Pedestrian Facilities provide detailed considerations for the design of transportation systems for pedestrians and bicycles, including information on geometric guidelines for the bicycle and pedestrian facilities discussed in Chapter 3.

LOCAL MANUALS AND LIABILITY PROTECTIONS 5.6

Cities are authorized to adopt or modify many of their own street design practices, standards, and guidelines. However, local jurisdictions typically follow State standards, partly because they may lack the resources to develop their own localized set of standards and practices, but also because alignment with State standards may provide protection from liability.

In lawsuits against municipalities arising from traffic-related crashes, one fundamental question is: "Did the municipality follow established or prevailing designs, standards, and guidance?" It should be noted, however, that State standards are not the only design guidelines that can confer protection from liability. The changes to streets discussed in this manual fall within the range of the guidelines or recommended practices of nationally recognized organizations such as AASHTO, the Institute of Transportation Engineers (ITE), NACTO, Urban Land Institute (ULI), and Congress for the New Urbanism (CNU). Adoption of design guidance from this manual, the Green Book and/or other nationally recognized authorities can address municipalities' liability concerns where street designs deviate from State manuals. Where municipalities adopt standards that differ from the Green Book but generally fall within the range of acceptable practice allowed by nationally recognized design standards, the adopting agencies are protected from liability to the same extent that they would be if they applied the Green Book.

It should be noted that the Green Book is silent on many design features, and that it does not consider design needs within unique, site-specific contexts. In these cases, cities can develop their own guidelines and standards.

PERFORMANCE MEASURES 5.7

Performance measures should be linked to the desired outcome of the policy. As mentioned at several points in this manual, conventional street design applies motor vehicle-centric performance measures. The most commonly used performance measure is the Level of Service (LOS), which prioritizes smooth vehicular flow. Using LOS as the basis for design choices leads to widening of streets and intersections, removal of on-street parking, and other strategies to accommodate and hasten motor vehicle traffic – all of which undermine the goals and tenets of Complete Streets and complete networks. Instead of relying on performance measures that focus narrowly on the needs of motorists, organizations implementing Complete Streets should:

Set targets for budget and staff time dedicated to Complete Streets policy implementation.

Define an evaluation process to measure performance at specified regular intervals.

Evaluate for all modes, through multimodal level of service (MLOS), bicycle level of service (BLOS), and pedestrian level of service (PLOS) evaluations.

Set targets for commonly measured performance metrics that include reduction of pedestrian and bicycle crash incidents and increased modeshift to pedestrian, bicycle, and transit trips.

Set infrastructure targets for miles of new pedestrian, bicycle, and/or transit infrastructure to be constructed within a specific time frame.

Performance measures may be discussed in broad terms, to allow for subjective evaluations, or may be tied to specific targets and related to specific metrics. Periodic comparisons may be made if baselines are established at the onset of implementation.

BENCHMAR

MULTIMODAL COMFORT A c
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USING MULTIMODAL LEVEL OF SERVICE (MMLOS) FOR DESIGN EVALUATION 5.11

Transportation planners and roadway designers use qualitative assessments to describe the perceived service a street provides to the people who use it. The quality of service conventionally has been measured using a Level of Service (LOS) metric. LOS assesses delay for motorists along a roadway section or at a signalized intersection, using a letter grade system that assigns an A for no delay and an F for greatest delay. This measurement considers quality of service only for motor vehicles using the roadway system.

The Highway Capacity Manual (HCM) provides details of the LOS computations for roadways and intersections. In its 2011 edition, the HCM also includes methods for calculating bicycle, pedestrian, and transit LOS, as well as corridor multimodal LOS (MMLOS). Because traveled ways serve different modes of transportation, it is recommended that planners and designer use MMLOS evaluations to compare service quality changes resulting from design decisions. The MMLOS methodology included in the HCM is limited in its usefulness, as it requires collection of numerous data to complete the calculations; the MMLOS methodology used by the Massachusetts Department of Transportation may be used as a substitute.

Originally, MMLOS was developed under National Cooperative Highway Research Program (NCHRP) Project 3-70. The MMLOS was developed for urban streets and is currently designed for analysis of steady-state conditions during a specified analysis period. MMLOS applies to all modes of travel (walking, motor vehicles, transit, and bicycles) on urban streets and assesses the impacts of facility design and operation on all users, except for commercial vehicles. The MMLOS analysis provides a tool to predict perceptions of quality of service. Bicycle Level of Service (BLOS) and Pedestrian Level of Service (PLOS) can be used to evaluate specific bicycle or pedestrian conditions; however, MMLOS is better suited to assess performance of networks serving multiple modes.

To conduct an MMLOS assessment, it is necessary to select a roadway segment that is used by bicyclists and pedestrians and that includes transit and five or six signalized intersections. The data required for conducting MMLOS includes street geometrics, such as the numbers of through lanes, turning lanes, signalized and unsignalized intersections and transit stops, and the widths of medians, travel lanes, bike lanes, parking lanes, shoulders and sidewalks. The methodology provides some basic default values for use.

Changes to alternative roadway designs can be evaluated using MMLOS methodology, which yields a separate numerical LOS rating for each mode. The numerical rating is then converted into an A-to-F letter grade system. LOS scales for different modes should be considered independently, allowing different target scores for each mode. For example, a D rating is a reasonable LOS target for motor vehicles on urban roadways, where drivers do not expect free-flowing traffic and higher LOS ratings for motor vehicles come with significant costs. However, a bicycle LOS target rating of C or higher should be set for all streets, with a rating of B or higher designated systems; for bicycles, a C rating represents a safely traversable surface – a baseline target for bicycle connectivity – and a B represents conditions more desirable for casual cyclists, who are more likely to ride on designated roadways. Higher targets for pedestrian LOS should be set in areas designated for improved walkability and transit prioritization, such as commercial districts, schools, and parks.

Using MMLOS instead of the traditional LOS assessment should lead to very different design decisions. When LOS is used as the only measurement of service quality, municipalities typically remedy low scores by widening streets, flaring intersections, and implementing other measures that improve motor traffic flow to the detriment of pedestrians and bicyclists. In contrast, conducting an MMLOS analysis of existing roadway segments will identify deficiencies in the system for all modes and lead to improvements for all users.

Complete the Streets

From Here…

- Adoption as NIPRC’s official formal CS design policy (w/ changes)
- Food Chain: 3PC, TPC & Commish
- Secondary actions include trainings, seminars, etc.
- Adopt in time to guide LPA’s before next STP, HSIP & CMAQ cycles

Thank You!

Mitch Barloga, AICP

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